BEYOND DETERRENCE: WHAT THE U.S. SHOULD DO ABOUT BALLISTIC MISSILES IN THE THIRD WORLD

SPECIAL COLLECTIONS

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April 24, 1990

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THREAT TO U.S. INTERESTS

U.S. Armed Forces and those of our allies are likely to be confronted in the future by hostile military forces increasingly armed with ballistic missiles. Even as the U.S. and Soviet Union are cutting back arsenals of nuclear Euromissiles, nations of the Third World are moving in a dangerous opposite trend towards the proliferation of ballistic missiles and missile technology.

It has become clear during the 1980's that the interests driving nations towards missile acquisition are not all peaceful. Although this effort began with the development and production of small rockets with a limited range and a few pounds of explosives for use on the battlefield or air-to-air combat, the trend is toward acquiring and producing larger and more powerful rockets capable of carrying a warhead weighing a thousand or more pounds to targets a thousand or more miles away. It is the programs for large missiles, with nuclear and chemical delivery potential, that are of particular concern. Significantly, many of the nations engaged in this work -- Algeria, Argentina, Brazil, China, Cuba, India, Israel, Kuwait, and Pakistan -- have not signed or ratified the Nuclear Nonproliferation Treaty, raising the possibility that some of these nations are also interested in developing nuclear weapons

for use with missile delivery systems. Of these non-signatories with missile programs, India, Pakistan, and Israel likely have a nuclear weapons capability already, and Argentina and Brazil may attain this status in the 1990's.[1] North Korea and Iraq also appear to be pursuing nuclear weapons programs despite signing the Nonproliferation Treaty.

Moreover, the Geneva Protocol of 1925 did not deter two signatories -- Iran and Iraq -- from using chemical agents on one another during their bitter war. The use of chemical munitions in the Iran/Iraq War suggests that it is only a matter of time before some countries overcome the technological hurdle of mating chemical warheads to ballistic missiles, as Iraq is evidently attempting to do. More ominously, the breaching of the psychological barrier to chemical warfare by Iran and Iraq, without strong world condemnation, may make it easier for others to cross this threshold with their missiles. President Saddam Hussein's recent claim that Iraq had acquired advanced chemical weapons and his threat to use them to annihilate half of Israel is indicative of this trend.[2]

The indigenous development of missile technology in the Third World has been exacerbated by the willingness of the West, Soviet Union, and China to sell missiles of increasing size and capability to the developing world. While the proliferation of missiles and related technology has not yet directly threatened U.S. territory, U.S. interests are increasingly at risk as the potential rises for heightened regional tensions and new demands on U.S. foreign policy, especially if nations otherwise friendly

to the U.S. attempt intimidation or actually use ballistic missiles against other U.S. friends or against nations to whose security the Soviets are committed.

As an indicator of what may lie ahead, the threshold for using such weapons was crossed in the Middle East during the Iran/Iraq War, providing an incentive to those belligerents to increase the capabilities of acquired missile systems and to develop their own and, in turn, fueling efforts by other states, such as Saudi Arabia, to acquire similar capabilities. These developments make it more likely that ballistic missiles could be used in a future conflict -- one in which the U.S. could be involved if vital interests must be protected. As the trend towards ballistic missile proliferation continues, therefore, the U.S. now faces difficult policy questions -- military, diplomatic, and economic.

BACKGROUND AND ANALYSIS

The proliferation of Third-World ballistic missiles is a problem of global dimensions.* At least 21 developing nations are trying to acquire a ballistic missile capability. The proliferaters are concentrated in the Middle East, South and Southwest Asia: Algeria, Libya, Egypt, Syria, Saudi Arabia, Israel, Kuwait, Iran, Iraq, North Yemen, South Yemen,

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*The ballistic missile programs of Third World states are summarized in the chart at the Appendix.

Afghanistan, Pakistan, and India. They are also scattered in East Asia, including Indonesia, North and South Korea, and Taiwan as well as in the Latin American nations of Argentina, Brazil, and Cuba. These countries of concern are in areas of endemic regional tension, but where the U.S. has important security interests. Each missile proliferater appears to be responding to a perceived threat from a neighboring state. Many of these same nations have the added potential to develop nuclear weapons. While the ranges of these nations' missiles vary from a few score to a couple of thousand kilometers, and the weight of the payloads they can carry and accuracies differ too, still, they make regional conflicts substantially more dangerous.

Nations that acquire or develop ballistic missiles do so to deter aggressors, intimidate their neighbors, enhance their prestige and political stature, and make money by selling weapons. The possible combination of nuclear and rocket know-how outside the established nuclear club is likely to increase the risks of regional nuclear conflicts that could draw in the big powers. While ballistic missiles in the hands of a peaceful state could help deter aggression, in the hands of an aggressor they could facilitate international blackmail or conquest. There is also the danger that states who gain military superiority from ballistic missiles will turn from peaceful relations with their neighbors to a more threatening posture.

Proliferation Sources

The source of this proliferation trend, on the one hand, has been the export of short range missiles primarily by the Soviet Union and the United States to client states, often with the concurrent transfer of technological know-how. These exports have included sounding rockets for sub-orbital scientific study as well as tactical missiles for battlefield use. China's sale of longer range CSS-2 missiles to Saudi Arabia and possible transfer of M-9 missiles to Pakistan, in addition to its nuclear assistance, adds yet another dimension to this problem.

Additionally, Third World states have undertaken indigenous development of missiles or satellite launch vehicles, frequently based upon technology acquired through long-standing cooperation and assistance from science and technology programs with developed countries. Oftentimes these national efforts have been an outgrowth of assistance received for "civilian" space programs, such as in India and Brazil, where the development of space launch vehicles and indigenously produced satellites serves both civilian and military purposes. Other nations, such as South Korea, Taiwan, Israel, and Iraq, have directly pursued a dedicated military missile program, attempting to develop their own missiles by upgrading and modifying less capable systems provided by the United States or the Soviet Union.

A third catalyst for missile proliferation has been the increasing collaboration among Third World nations themselves,

such as Argentinian cooperation with Egypt and Brazil with Iraq and Libya.

Destabilizing Effects

Although ballistic missiles carry much less weight in their nosecones than the bombload of a conventional fighter bomber, and are less accurate and more expensive, they enhance greatly the power of small nations. They are also inherently destabilizing. Why? Unlike aircraft, modern missiles are difficult to intercept even with the advanced technology that most states do not yet possess. They give a country the ability to penetrate another's thickest air defenses, enabling countries with less capable air forces to attack deep targets. By buying CSS-2 missiles from China, for example, Saudi Arabia has acquired a weapon that it can fire into the heart of Tel Aviv and which Israel is unable to shoot down on the way. This vulnerability has prompted an Israeli program to develop an anti-ballistic missile -- the ARROW.

Efforts to develop more accurate missiles and larger, more powerful warheads will permit and might encourage preemptive strikes on an opponent's key military forces. The temptation may be strong to attack an enemy's missiles first, before they are launched. Such a preemptive capability can alter a regional balance of power by its mere existence -- a further incentive for states to match the ballistic missile capabilities of adversaries. Missiles also enable belligerents to put opposing civilian populations at risk, without jeopardizing pilots and aircraft in attacks on cities. As in the Iran/Iraq War,

hundreds of missiles, too inaccurate to hit military targets, may be fired at civilians to kill, maim, and terrify -- and create internal domestic pressure to terminate hostilities.

Finally, the high cost of missiles offers a strong incentive to use non-conventional warheads which maximize utility. Used with conventional munitions, inaccurate missiles do little damage to military targets. With a nuclear or chemical warhead, however, accuracy becomes less important and the effectiveness of the weapon in political terms -- as well as in sheer destructiveness -- increases dramatically.

U.S. POLICY CONSIDERATIONS AND ALTERNATIVES

U.S. policy must aim to reduce both the political threat that ballistic missile proliferation poses to such U.S. interests as regional stability, access to oil, and freedom of navigation, as well as direct military threat to U.S. forces -- and possibly U.S. territory -- should it become necessary to confront hostile states armed with these weapons. The spread of missile technology and the resulting plethora of ballistic missile programs of increasing capability suggests a dual track for U.S. policy to address both the supply of technology as well as the existence and likely increase of the missiles in Third World nations. What can the U.S. do to prevent the further spread of the technology? If states continue to proliferate ballistic missiles, what should be the U.S. response? The analysis which follows will address policy alternatives in the context of these two subject areas.

Preventing the Spread of Missile Technology: MTCR and Beyond

The U.S. and Soviet Union have lost their monopoly on the production of missile technology. Many nations, including Japan, France, Italy, and China, now manufacture the components, as well as the rockets, for space launch vehicles, thus complicating technology control efforts. Despite this constraint, export controls continue to be necessary to restrict the spread of missile technology, although there are important limitations to their effectiveness.

In an effort to retard ballistic missile programs and prevent acquisition of nuclear-capable missiles by additional countries, the U.S., Canada, France, West Germany, Italy, Japan, and the United Kingdom established a Missile Technology Control Regime (MTCR) in 1987 by agreeing to common export guidelines. The guidelines and lists of items to be regulated are designed to limit the proliferation of unmanned systems capable, at least, of delivering a 500 kg payload to a range of 300 km.

The guidelines prohibit the transfer of production facilities for delivery systems with these parameters and establish a "strong presumption" to deny transfers of complete delivery systems including complete rocket systems, such as ballistic missile systems, space launch vehicles, and sounding rockets; unmanned air vehicle systems, including cruise missile systems and target and reconnaissance drones; and the following complete subsystems: individual rocket stages; reentry vehicles; rocket engines; guidance sets; thrust vector controls; and warhead safing, arming, fuzing and firing mechanisms. Under

the presumption of denial policy, export licenses for these items will be disapproved unless, in rare instances, the items are not destined for a specific missile or rocket project of concern and the supplier government takes "all necessary steps" to ensure proper end use and obtains "binding...undertakings" from the recipient government regarding end use. Other subsystems and components are to be regulated on a case-by-case basis.[3]

In much the same way that nuclear controls have impeded, but have been unable to halt, the emergence of additional nuclear weapons capable nations, it will be unrealistic to expect U.S. export control policy to prevent the flow of all significant missile technology to countries of concern. The general advance of technology in the world also suggests that it will be impossible to prevent more countries from developing a ballistic missile delivery capability, although in many cases that capability will be crude by U.S. standards. The number of countries who can now manufacture sophisticated aircraft is indicative of this technological trend. As countries further develop their indigenous scientific and technological capabilities, current U.S. arms and technology export controls may become increasingly less effective.

Foreign policy and economic considerations also impinge on export control policy, producing trade-offs in our efforts to slow the spread of missile technologies. While U.S. export policy for missile technology has been strict, control of dual civilian and military use equipment has been less stringent. In

other industrial countries, the control of both relevant missile and dual-use technology has been weaker, and this has exacerbated U.S. control efforts. It has been more difficult for the U.S. to apply a control standard to dual-use items intended for civilian applications, although also capable of military use, particularly when the same technology may be more readily available outside U.S. borders.

While export control efforts will remain imperfect, the U.S. should aim to restrict key technologies, especially guidance and control technology and systems associated with launch and reentry vehicles. The effectiveness of these controls in view of the above obstacles requires cooperation among the nations producing missile technology, not infrequently at the expense of individual economic interests from foregone sales. The Missile Technology Control Regime is a significant step towards controlling the acquisition of nuclear-capable missiles by additional countries, but its guidelines have been subject to differing national interpretations and lack of uniformity in export decision making since each national government retains the regulation of transfers from its territory. The MTCR created no enforcement mechanism nor international organization to monitor missile-related exports.

Despite its imperfections, the U.S. should adhere to the MTCR guidelines and through diplomatic efforts push its partners towards strengthening the effectiveness of MTCR controls. Our goal should be to impede the rate of spread of dangerous technologies to better manage their destabilizing effects.[4]

With this goal we buy time to seek political settlements and to improve our own technology to deter, and, if necessary, attack ballistic missiles or their bases. Unilaterally, the U.S. should strengthen federal acquisition regulations to provide tighter proliferation controls against those firms who fail to comply with their own government's regulations or the MTCR provisions. Measures could include the banning or suspension of domestic or foreign contractors from U.S. Government contracts, denial of U.S. export licenses, or ban on violators' imports into the U.S. International memoranda of understanding and other cooperative defense programs the U.S. has with other governments should be reviewed to ensure compliance with the MTCR.[5]

The U.S. should also urge a broadening of MTCR participation by encouraging other nations that produce missiles, or their component systems, to adopt the policy guidelines. This effort should include pressuring MTCR partners, as well as others that are not, such as the Soviet Union and China, to refrain from the export of specific systems, technologies, or technical assistance. The broadening of trade with Eastern Europe and the Soviet Union, with accompanying pressure to sell dual-use technology, will require especially close cooperation to avoid undercutting national economic interests, MTCR controls, and trade relations with our partners.

U.S. Response to Ballistic Missile Proliferation

To deal with the ballistic missiles that already exist in the Third World and additional, more capable ones which may be

developed or acquired despite export controls, two approaches are suggested: traditional diplomatic and economic pressure and a military option.

Diplomatic and Economic Initiatives

The U.S. must seek to persuade those states that are or become capable of producing ballistic missiles not to use their technology for actual development, and must work to persuade other states not to acquire or transfer these systems. In addition to increased direct pressure, U.S. diplomatic steps and economic measures should be designed to reduce the security threats that have motivated states to acquire ballistic missiles and that may lead to their use.[6] Such measures, including those taken multilaterally as well as unilaterally, should aim to reach political resolutions of regional differences and to reduce the threat from other non-conventional weapons including chemical, biological, and nuclear arms.[7]

This effort with missile proliferaters who maintain friendly relations with the U.S. and respect our involvement could establish a more positive atmosphere for direct negotiations. This, in turn, would lower tensions and build confidence.[8] Although the choice of initiatives must ultimately come from proliferating states themselves, the U.S. should actively encourage information and intelligence exchanges, facilities inspection agreements, high level visits, dialogue, and negotiations between rival states, and should propose other confidence-building measures to alleviate fears of missile

attack. These might include notification procedures for missile test launchings and launchings during military exercises.

A more active "carrot and stick" approach for states unfriendly to the U.S., such as Iran and Libya, could balance U.S. pressure with diplomatic and economic overtures, although the wisdom of the U.S. making the first move before changes occur in those states' unacceptable behavior is arguable. Still, the U.S. might induce more cooperative behavior from hostile states by raising the costs to countries engaged in missile programs through export controls and selective trade sanctions, while increasing the benefits from restraint. U.S. efforts to curb the demand for ballistic missiles in this way could appeal to these states' self-interests rather than appear as a conspiracy among industrial countries aimed solely at preserving traditional great power prerogatives.[9]

In any case, broad, mandatory economic or military sanctions may be problemmatical at best. In the absence of an MTCR enforcement mechanism, they could erode whatever influence the U.S. may wield if applied unilaterally and injudiciously and damage essential international cooperative efforts.[10] Alternatively, the U.S. could press for greater Soviet cooperation regarding its client states' missile programs.[11] Public diplomacy should also be used actively and extensively to focus media attention and world opinion on dissuading nations from producing or using their ballistic missiles.

Admittedly, these initiatives have had limited, if any, success thus far in reducing tensions and preventing the spread

and use of ballistic missiles. Even substantial U.S. military assistance has not deterred states such as Egypt and Pakistan from seeking a ballistic missile capability in response to perceived security threats. But U.S. good offices and the superpower example of security gains from negotiated Euromissile reductions could prompt others to recognize their own security interests in ballistic missile control and to eventually moderate their positions. The U.S. should support multilateral arms control discussions, perhaps under the auspicies of the United Nations, as a useful first step. Limitations could be sought on the numbers, types, ranges, and deployment areas of particular weapons. Talks could begin initially between two or more states in a single region and expand to account for inter-regional security concerns. Ballistic missile control between India and Pakistan, for example, will ultimately need to include China to achieve success.

The U.S. must remain engaged in attempting to reduce the threat from missile proliferation. Despite the frustrations, the failure to continue and increase U.S. diplomatic and economic action, in conjunction with promotion of export controls will send a signal of U.S. disinterest that will do little to discourage further missile proliferation.

Military Response

Finally, we should be prepared with a military response to protect U.S. interests. This response should be part of a military strategy which relates the use of force to broader political objectives for U.S. security and global stability.

Thus, our military strategy must be integrated with our political, diplomatic, and economic initiatives to:

-- Prevent an attack on U.S. territory or U.S forces;

-- Prevent an attack on or among U.S. allies considered important to U.S. security;

-- Resist political intimidation or military threats to vital economic and security interests, particularly access to oil and freedom of navigation;

-- If attacked, apply military power to reduce the potential for further damage and bring the conflict to early termination.

To achieve these objectives, our military strategy should rely on deterrence backed up by superior capability, as it always has. But deterrence itself should be predicated on a more comprehensive strategy, with options for overt action and covert operations, to include active and passive measures, and based on a doctrine for limited military operations. Possible courses of action may thus range from preemption and sabotage to conventional response to the threat of nuclear retaliation.

This strategy will require new kinds of planning for missions, force structures, and equipment yet to be developed. The U.S. will need to be prepared for a wider range of contingencies and a broader capability to project power into other regions. Since the nature of the threat from ballistic missiles is qualitatively different than the Soviet threats of European invasion or nuclear attack that have long dominated our thinking and force planning, the structure of our forces will

require alteration to be able to respond effectively and rapidly to different scenarios. As U.S. forces adapt to this changing environment, technology will continue to be a force multiplier. The interrelationships between threat, planning, force structure, and technology strongly suggest that military strategy be integrated, with decisions on each element taken interdependently.

The U.S. raid on Libya and Israeli preemptive attack on Iraqi nuclear facilities were isolated incidents in which precise means were applied to limited ends. While the U.S. is capable of similar thrusts against a ballistic missile threat, such actions need to be connected to a larger strategy which, as an extension of policy, links military action to political goals. If diplomatic and economic measures fail to deter would-be aggressors intent on threatening the U.S. with the use of ballistic missiles, a plan to effectively employ military force, consistent with political goals, must be available as a policy option. Current policy must more actively address the military and political threat with measures which plan beyond the current bounds of diplomatic or economic pressure.

New Environment for Military Action

A military strategy to address the ballistic missile threat requires, first, a reorientation of our assumptions about a world where the East-West military balance converges towards a more stable equilibrium, while military as well as economic power becomes more widely distributed globally. Threats to the U.S., and American vulnerabilities, can no longer be seen merely

in the context of East-West rivalry. Nations that acquire ballistic missiles, particularly those who are or become hostile towards the U.S., will have an increasingly larger impact on the global military balance, diminishing the relative advantages of both U.S. and Soviet forces. U.S. security policy, and thus our military strategy, has focused on the Soviet threat and the Soviet nuclear capability. Now, nations that acquire ballistic missiles, and especially those nations that also develop nuclear, chemical, or biological weapons, will be able to threaten the U.S. and their neighbors with similar incalculable destruction.

The parallel trends of an increasing proliferation of missiles and other weapons in the Third World and a decreasing Soviet threat, suggest that regional conflict will be the more likely challenge for the U.S. military. Such conflict is less likely to have an East-West component but will need to be regarded as a threat in its own particular context. Accordingly, in this emerging environment, the U.S. will need to diversify and strengthen its ability to bring force to bear effectively, in a precise and timely manner, to thwart a wide range of plausible aggressions, including the possible use of ballistic missiles against U.S. interests. To this end, we should exploit emerging technologies of precision guidance, control, and intelligence that offer our conventional forces more selective and effective capabilities for destroying military targets.[12]

At the same time, as resource constraints become more serious, careful allocation of military assets will be necessary to assure retention and enhancement of the appropriate means of force to support long-range political objectives. For ballistic missile threats this means forces that are structured to respond quickly across contingencies that may range from the Middle East to Latin America or East Asia. Such a strategy must be intrinsically different from that of the Cold War, which responded to an essentially unidimensional threat in a bipolar world. We must now be prepared not to fight the last war, but to respond, if necessary, with military force attuned to a new environment.

Preparing and Using Military Force

Given these new assumptions, we might expect hostile action towards the U.S. to be indicated by the following:

-- Movement of ballistic missiles into a position which can directly threaten U.S. territory or forces, or those of our allies asociated with our vital economic and security interests;

-- Persuasive intelligence indicating intent to launch a ballistic missile towards U.S. territory or forces;

-- Production, assembly, or aquisition of ballistic missiles in quantities intended to achieve regional superiority to the detriment of U.S. interests.

Under one or more of these conditions, if efforts to control missile technology have not succeeded and diplomatic and economic measures have failed to deter specific military

threats, the use of force must be contemplated. Our resolve to use force, if necessary, must be clearly articulated. The force structure we build under the new post-Cold War assumptions should provide a strong deterrent and the means to achieve the objectives noted earlier.

The threat to use military force maintained in a high state of readiness as a deterrent, or its actual employment, should not be limited by a force structure which is too heavy, with too short a reach, to be used effectively. Our current maritime strategy, for example, is intended to respond to regional conflicts, but political constraints on the use of American foreign bases, overflight rights, and logistical obstacles pose limitations to the use of American air or land power beyond that which can be provided by the Navy.

Given these realities, and the possibility that our difficulties of access may worsen in the future, our military strategy should provide for improvements in American forces, taking advantage of substantial changes in military technology in the next 20 years, to increase capabilities -- and policy makers' flexibility -- to respond militarily to regional conflicts.[13] This means versatile, mobile forces, minimally dependent on overseas bases, that can rapidly deliver precisely controlled strikes against distant military targets. It includes a robust aircraft carrier fleet, modern surface warships, the Advanced Tactical Aircraft, highly ready airborne and special operations forces, and enhanced sea and airlift. Development of long-endurance, day and night-capable space

systems to expand communications, tracking, surveillance, intelligence, and control of our forces, and making these systems survivable or more easily replaceable, will be especially important.[14]

Short of deployment of U.S. ground forces to neutralize ballistic missile sites, more effective military power can also be realized by:

-- enhancing the ranges and accuracies of cruise and conventionally armed tactical missiles;
-- improving the capabilities of conventional smart munitions;
-- developing laser, particle beam, and low-observable (Stealth) technologies, as well as sensors, other microelectronic, optical, and communications systems for command, control, and intelligence necessary for monitoring and precise targeting;
-- improving electronic countermeasures to defeat ballistic missile guidance systems; and
-- maintaining a naval and land bomber force with the training of U.S. forces to execute the precise operations required to strike an adversary's ballistic missile bases or production facilities.

This strategy should aim to more closely match means to ends by aligning force structure more closely to likely needs, and better position the U.S. for credible responses to any ballistic missile aggression. In the long run this may be

economical, saving funds now allocated for warfighting in Europe.

As we readjust our military forces to respond better to the ballistic missile threat in a changing global environment, we should not do so in isolation from our allies who have joined us in the MTCR in recognition of a common problem. This may mean a sharing of technology and intelligence, as well as joint training to defend mutual interests beyond alliance boundaries.

Missile Defense

Currently, the threat of force and retaliation are our only options, but these do not address the problem of avoiding damage to U.S. interests or territory should a hostile missile be fired. This can change.

We should continue moving with our allies toward a posture that includes active and passive defenses against ballistic missiles. Passive measures, as with strategic defense, should include hardening, dispersal, multiplication, and redundancy of critical facilities. Active measures should include extending and upgrading air defenses with ground and space-based surveillance, tracking, and interceptor systems and ground based command centers.

How perfect these systems may be in the aggregate is an argument that should not impede deployment. Unlike the Soviet Union, Third World states do not have thousands of warheads atop thousands of missiles. The considerably smaller numbers of missiles that these states possess will permit even a partial ballistic missile defense to increase the probability of

successfully blocking an attack, while simultaneously reducing an aggressor's confidence in the success of an attack. An attacker may face the prospect of using a proportionally higher number of his missiles, which may still be a relatively insignificant quantity in terms of a strategic defense designed primarily to detect and counter substantially more numerous Soviet launches. Thus, relatively thin defenses may be effective without significantly disturbing Soviet perceptions of the strategic balance and view of U.S. first strike intentions.

Development of ballistic missile defenses is not without significant challenges. Aside from the technical problems of developing such new technology and insuring its reliability, funding difficulties could also impede progress and delay deployment. There are political obstacles to persuading the American people that a ballistic missile defense enhances deterrence in the face of a significant and growing threat. Despite the obstacles, the technology will be developed over time and will ultimately provide a defensive last-resort if the mix of other policy options suggested above is unable to reverse the dangerous trend in ballistic missile proliferation and the threats that ballistic missiles now pose to U.S. interests.

For these reasons, the U.S. should undertake the following specific initiatives:

1. Inform and persuade the American people that the U.S. faces a military threat from the proliferation of ballistic missiles and that missile defense should be a part of our military strategy to deter and defend against attack in a multicentric

world. Frequent public statements on this issue by the President, Secretaries of Defense and State, and CIA Director in speeches, press conferences, and congressional testimony could raise the visibility and importance of this issue on the U.S. defense and foreign policy agendas.

2. Recast the Strategic Defense Initiative (SDI) to more broadly include research, development, testing, and initial deployment of systems to defeat medium range and shorter ballistic missiles of the type being proliferated and used in the Third World while continuing the work on longer range strategic defense against Soviet missiles. If additional funding is not forthcoming for this enhanced mission, reprogramming should be used to encourage research applicable to both longer and shorter range systems.

3. Accelerate development of the Brilliant Pebbles system.

4. Adjust the specific deployment schedule of Brilliant Pebbles and other missile defense systems as evolving technology is tested and proven. Even limited deployment can affect an aggressor's perception of risk.

5. Continue research on more exotic technologies including directed energy systems and the jamming and spoofing of command and control networks.

6. Develop a defensive capability against anti-satellite weapons in anticipation that missile proliferaters (and the Soviets) may move to acquire such technology in the future.

7. Our allies can help. A new weapon known as ARROW that Israel is developing with U.S. funding to shoot down ballistic

missiles in mid-flight offers promise as a defensive system. Other important research on theater architecture and competing ground and spaced-based interceptors is being conducted under contracts in the United Kingdom, West Germany, Italy, Japan, France, Canada, Belgium, Denmark, and the Netherlands. The U.S. should consult fully with our allies as the missile defense program evolves, and, where appropriate, seek their active participation.

CONCLUSION

The threat from ballistic missile proliferation clearly requires a sound national strategy that provides the appropriate diplomatic, economic, and military means to achieve our political objectives of security and stability through deterrence. This strategy must operate in an environment where Cold War conditions and assumptions about defense no longer apply, where the kind of conventional and nuclear deterrence that worked in the past with the Soviets may not be effective with countries that possess or are attempting to acquire ballistic missiles. Although we will continue to rely on the assurance to those who might threaten us that their aggression will be opposed by military force, we will need to extend our strategy beyond deterrence to allow for a more complex environment where more conventional diplomatic, economic, and military actions may not achieve our political objectives. Unless we develop a coherent strategy that reflects the emergence of new military powers, new technologies, new sources

of conflict, and new opportunities for cooperation, the threat from ballistic missiles and their proliferation may loom larger.

APPENDIX

BALLISTIC MISSILE PROGRAMS*

Country	Potential Launch Vehicle/Missile	Comment
Space Launch		
India	SLV-3 operational; ASLV, PSLV & GSLV planned	SLV-3 has 40 kg payload
Brazil	Sonda IV operational; VLS planned	Sonda IV has 500 kg payload. Range about 300 km
Pakistan	Plans to develop a space launch vehicle	
Argentina	Condor under development	400 kg payload to 100 km. Condor 1: 150 km; Condor 2: 800 km
Military Ballistic Missiles and Large Rockets		
Afghanistan	Scud-B	300 km; USSR supplied
Algeria	FROG-7	70 km. USSR supplied
Brazil	ASTROS (SS-30, 40, 60), X-40 with SS300, SS1000, and MB/EE-150 under development	Indigenous. Astros 2: 68 km; SS300: about 300 km; EE150: about 150 km
China	CSS-2	2,200 km.
Cuba	FROG-7	70 km. USSR supplied
Egypt	FROG-7 Saqr-80 Scud-B Badr-2000	70 km 80 km 300 km 800 km

India	Prithvi successfully test launched.	Indigenous; 240 km
	Agni under development	2,400 km
Indonesia	RX-250 under development	about 250 km
Iran	Oghab	40 km
	Shahin-2	100-130 km
	Nazeat	100-130 km
	Scud-B	300 km
Iraq	Scud-B, FROG-7, SS-21	From USSR
	ASTROS MLRS	From Brazil; 68 km
	al-Hussayn	600 km
	al-Abbas under development	900 km
Israel	Lance	U.S.; 110 km
	Jericho-1	Indigenous; 450 km
	Jericho-2 under development	Indigenous; 1,450 km
Kuwait	FROG-7	70 km; from USSR
Libya	Scud-B, FROG-7	From USSR
	ASTROS MLRS	From Brazil; 68 km
North Korea	FROG-7	From USSR; 70 km
North Yemen	SS-21	USSR; 120 km
Pakistan	Haft-2 under development	80 km
Saudi Arabia	ASTROS-2	Brazil; 68km
	CSS-2	China; 2,200 km
South Korea	Honest John	U.S.; 33 km
	"Korean SSM"	Adaptation of U.S. Nike-Hercules
South Yemen	FROG-7	USSR; 70 km
	SS-21	USSR; 120 km
	Scud-B	USSR; 300 km
Syria	FROG-7	USSR; 70 km

	SS-21	USSR; 120 km
	Scud-B	USSR; 300 km
Taiwan	Honest John	U.S.; 33 km
	Ching Feng (Green Bee)	Indigenous; similiar to Lance

Other Military Missile Production

Brazil	MAS-1 Caracara	Air-to-surface
	Corba	Antitank
	MSS-1	Antitank
	MAA-1 MOL	Air-to-air
	MSA 3.1	Air defense
	Acaua and Suia	RPVs
	SM-70 Baracuda	Anti-ship
India	Trishul	Surface-to-air
	Akash	Surface-to-air
	Nag	Antitank
	Milan 2	Antitank
	Pilotless Target Aircraft	RPV
Israel	Gabriel	Antiship
	Barak	Air defense
South Korea	Sea Dragon	Antiship
	Kooryang	MRLS
Taiwan	Tien Kung	Surface-to-air
	Tien Chien	Air-to-air
	Hsien Feng I	Antiship

*Compiled from data in Manfredi, et al., CRS Report for Congress: Ballistic Missile Proliferation Potential of Non-Major Military Powers, August 6, 1987, pp. 4-5 and The Economist, May 27, 1989, p. 44.

NOTES

[1] Joseph S. Nye, Jr., "Arms Control After the Cold War," Foreign Affairs, Vol. 68, No. 5, Winter 1989/90, pp. 52 and 55.

[2] Alan Cowell, "Iraq Chief, Boasting of Poison Gas, Warns of Disaster if Israelis Strike," New York Times, April 3, 1990, p. 1, and Robert Pear, "Iraq Can Deliver, U.S. Chemical Arms Experts Say," New York Times, April 3, 1990, p. 8.

[3] Arthur F. Manfredi, Jr., et al., CRS Report for Congress: Ballistic Missile Proliferation Potential of Non-Major Military Powers, August 6, 1987, p. 9, and Statement of Mr. Jim E. Hinds, Deputy Assistant Secretary of Defense in Ballistic and Cruise Missile Proliferation in the Third World, Hearing Before the Subcommittee on Defense Industry and Technology of the Committee on Armed Services, United States Senate, One Hundred First Congress, First Session, S. Hrg. 101-275, U.S. Government Printing Office, May 2, 1989, p. 19.

[4] Nye, p. 60.

[5] Barbara Starr, "USA Debates Missile Proliferation," Jane's Defense Weekly, Vol. 12, No. 19, November 11, 1989, p. 1007.

[6] For a concise review of the security considerations that have motivated states to acquire balistic missiles see testimony of Geoffrey Kemp in Ballistic and Cruise Missile Proliferation in the Third World, S. Hrg. 101-275, pp. 75-82.

[7] Gerard C. Smith and Helena Cobban, "A Blind Eye to Nuclear Proliferation," Foreign Affairs, Vol. 68, No. 3, Summer 1989, p. 69.

[8] As an example of U.S. efforts to encourage confidence-building, see Michael R. Gordon, "U.S. Urges Talks on Missiles in Mideast," New York Times, December 27, 1988, p. A3. Additional proposals are contained in the testimony of Dr. Janne E. Nolan in Ballistic and Cruise Missile Proliferation in the Third World, S. Hrg. 101-275, pp. 66-68.

[9] Dr. Janne E. Nolan in Ballistic and Cruise Missile Proliferation in the Third World, S. Hrg. 101-275, p. 62.

[10] See David B. Ottaway, "U.S. Aide Opposes Halting Arms Sales Over Missiles," Washington Post, Vol. 112, Col. 1, p. A37, November 8, 1989; and "Bush Aides Say Sanctions Could End Israeli Programs," Washington Post, Vol. 112, Col. 1, p. A10, October 31, 1989.

[11] David B. Ottaway, "Missiles' Spread Again Topic for U.S.-Soviet Talks," Washington Post, Vol. 112, Col. 1, p. A32, May 7, 1989.

[12] Fred C. Ikle, Albert Wohlstetter, et al., Discriminate Deterrence, U.S. Government Printing Office, Washington, D.C., January 1988, p. 64.

[13] J. Michael Cleverley, Post-Cold War Strategy: Multidimensional Threats, Multipolar World, unpublished manuscript, National War College, Washington, D.C., March 31, 1989, pp. 19-20.

[14] Ikle, pp. 3-4, 21-22, 52-54.

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